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APPLICATION FOR LETTERS PATENT FOR:

TETHERED TOY WITH SAFETY DISCONNECT AND ITS ASSOCIATED METHOD OF OPERATION

INVENTOR: RICKY NG

Attorney for Applicant
Eric A. LaMorte
Reg. No. 34,653
LaMorte & Associates, P.C.
P.O. BOX 434
Yardley, PA 19067
(215) 321-6772
mail@uspatlaw.com

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BACKGROUND OF THE INVENTION

1. Field Of The Invention

The present invention relates to tethered toys. More particularly, the present invention relates to tethered toys that embody safety features that prevent the tethered toy from being a potential source of strangulation to a child.

2. Description Of The Prior Art

The field of toys is replete with toys that are attached to a string, cord or other such tethers. Such toys have been in existence in many different forms for hundreds of years. Such toys range from wooden pull trains to yo-yos.

A problem associated with tethered toys is that children have a tendency to swing the toy about its tether. When a weighted object, such as a toy, is swung on a tether, the angular momentum embodied by the swinging toy has a tendency to cause the toy to wind around any object that intersects the path of the tether. Unfortunately, this phenomenon can have

disasterous consequences for unaware children. In certain circumstances, a child may swing a tethered toy around their head. If not careful, the tether of the swinging toy can begin to wind around the child's neck. Once the tether catches around the neck, angular momentum causes the tether to continue to wind around the child's neck, becoming tighter and tighter with each rotation. This, of course, can cause a child to strangle or restrict the flow of blood to the child's brain, thereby causing physical harm and even death.

The problem of tethered toys becoming entangled on a child is even more prevalent when an elastic tether is used. When an elastic tether is used on a toy, the tether stretches as the toy is spun on the tether. This causes potential energy to be stored in the elastic tether. As such, a stretched tether may recoil with more velocity than is expected and can therefore wrap around a child quite unexpectedly.

Many types of toys have elastic tethers. One such toy is what is commonly referred to as a yo-yo ball. Yo-yo balls have a ball or balloon at one end. The ball or balloon is often weighted with liquid stored within the ball or balloon. The ball/balloon

has an elastic tether. At the end of the tether is a hoop that is to be placed on the finger. The ball/balloon is then grabbed by the hand and thrown away from the hand. The elastic tether stretches and recoils the ball/balloon back into the hand.

With such tethered toys, the tether is required to be very strong and durable. If not, the tether would break after repeated cycles of stretching and retracting. Furthermore, if the tether breaks when the yo-yo ball is being thrown, the ball may fly away and strike another person or fragile object. Also, if the tether breaks, the broken tether can recoil into the child's face and cause harm to the child's eyes. For these safety reasons, the tether should be strong. However, if the tether wraps around a child's arm, leg or neck, it is not desirable to have a strong tether. Rather, it is desirable to have a tether that is fragile so that it can be easily broken by the child if need be. A contradiction in design criteria therefore exists.

Consequently, a need exists for a toy tether that is very strong and durable when a direct pulling force is being applied to the tether, yet is very severable when the tether wraps around an object an

needs to be broken. In this manner, the tether will not break when stretching and pulling a toy, yet the tether will break easily if wrapped around an object. This need is met by the present invention as described and claimed below.

SUMMARY OF THE INVENTION

The present invention is a safety connector that is used on a tether, such as those used on tethered toys. The connector has two halves that can be selectively interconnected. The two halves are attached to separate sections of a tether. Once interconnected, the two halves of the safety connector remain attached until one of two circumstances occurs. In the first circumstance, the two halves of the safety connector separate when a tension force is experienced in the tether that approaches the tensile strength of the tether. In this manner, the safety connector prevents the tether from breaking during normal use.

In the second circumstance, the two halves of the safety connector separate when a minimal bending force is applied to the safety connector. Such a bending force occurs in the safety connector if the

tether containing the safety connector wraps around an object. As such, should the tether accidentally wrap around any object, including a child's body, the tether will separate and thus prevent harm.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the present invention, reference is made to the following description of exemplary embodiments thereof, considered in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of an exemplary embodiment of a yo-yo ball toy in accordance with the present invention;

FIG. 2 is a cross-sectional view of the safety connector, shown in a separated configuration;

FIG. 3 is a cross-sectional view of the safety connector shown in a joined configuration;

FIG. 4 is a cross-sectional view of the safety connector experiencing a bending force; and

FIG. 5 shows a tether containing the safety connector being wrapped around an object, therein applying a bending force to the safety connector.

DETAILED DESCRIPTION OF THE INVENTION

Although the present invention can be used on any toy that has a tether, such as a paddle ball assembly, a pull toy or the like, the present invention is particularly well suited for use on yo-yo balls. Accordingly, and by way of example, the present invention will be described as applied to the tether of a yo-yo ball. However, such an embodiment is presented merely to set forth the best mode contemplated for the invention and should not be considered a limitation of the application of the present invention to other tethered toys.

Referring to Fig. 1, a yo-yo ball toy 10 is shown that has been modified with the technology of the present invention. The yo-yo ball toy 10 has a ball 12 at one end. The ball 12 can be a liquid filled balloon or a molded sphere. An elastic tether 14 is attached to the ball. The tether 14 has two ends. One end of the tether is joined to the ball 12.

The opposite end of the tether 14 is formed into a finger loop 16. The tether 14 has an unstretched length of between eight inches and twenty-four inches.

The tether 14 can be formed from elastic string. However, in the shown embodiment, the tether 14 is molded from an elastomeric material. Strong, elastic tethers can be made from tri-block copolymers that have been mixed with plasticizing oil. Such elastomeric material can be molded into a tether 14, wherein the tether 14 can elastically stretch to at least twice its unstretched length without damage.

One reason that a molded tether 14 is preferred is that a sphere attachment flange 18 at one end of the tether 14 and the finger loop 16 at the opposite end of the tether 14 can be molded simultaneously with the tether 14 in a single molding operation.

In the shown embodiment, the tether 14 is not a single piece. Rather, the tether 14 is divided into two separate sections 20, 22. A first section 20 of the tether 14 connects to the ball 12. The second section 22 of the tether 14 is connected to the finger loop 16. The first section 20 of the tether 14 and the second section 22 of the tether 14 both

terminate with at a common safety connector 25. The safety connector 25 has two halves that can be selectively connected and separated. One half of the safety connector 25 is coupled to the first section 20 of the tether 14. The opposite half of the safety connector 25 is coupled to the second section 22 of the tether 14.

The two halves of the safety connector 25 interconnect and thus join the two sections 20, 22 of the tether 14. The two halves of the safety connector 25 remain interconnected provided the two halves of the safety connector 25 experience tension forces normal for the use of the yo-yo ball toy 10. However, if the safety connector 25 experiences a particularly high tension force or a nominal bending force, the two halves of the safety connector 25 immediately disconnect. As such, if the ball 12 at the end of the tether 14 becomes ensnared and a child pulls on the tether 14, the safety connector 25 will separate before the tether 14 breaks. More importantly, if the tether 14 wraps itself around a child, the safety connector 25 will disconnect and release the tether 14 before any harm can be caused to the child.

Referring to Fig. 2, it can be seen that the safety connector 25 has two halves 26, 28. Each half 26, 28 has an exterior surface that is cylindrical in shape. The exterior length of each half of the safety connector 25 is approximately one-half inch. As such, when the two halves 26, 28 of the safety connector 25 are joined, they have a combined length of approximately one inch. This length is important as a release feature of the safety connector 25, as will be later explained.

From Fig. 2, it can be seen that each half 26, 28 of the safety connector 25 has a hollow section 29. The ends of the tether sections 20, 22 extend into these hollow sections 29 and are locked in place. In the shown embodiment, pins 30 are used to join the sections 20, 22 of the tether 14 to the halves 26, 28 of the safety connector 25. However, other mechanical joining means, such as crimping and heat bonding can also be used. Alternatively, the sections 20, 22 of the tether 14 can also be adhesively bonded to the halves 26, 28 of the safety connector 25.

Of the two halves 26, 28 of the safety connector 25 that are shown, it can be seen that one half 26

has a bulbous protrusion 32. The bulbous protrusion 32 has a mushroom shape with an enlarged head 33 and a recessed neck region 34. The opposite half 28 of the safety connector 25 defines a tapered recess 36. The front of the tapered recess 36 defines an initial opening 37 that is smaller than the bulbous protrusion 32 on the other half 26 of the safety connector 25. As a consequence, when the two halves 26, 28 of the safety connector 25 are pushed together, the enlarged head 33 of the bulbous protrusion 32 enters the initial opening 37 of the tapered recess 36 with an interference fit and the two halves 26, 28 of the safety connector 25 snap together.

Referring to Fig. 3, the safety connector 25 is shown with its two halves 26, 28 snapped together. The diameter of the enlarged head 33 of the bulbous protrusion 32 is larger than the diameter of the initial opening 37 (Fig. 2) of the tapered recess 36. Accordingly, the bulbous protrusion 33 cannot be pressed directly into the tapered recess 36 or pulled directly out of the tapered recess 36 unless the tapered recess 36 is momentarily deformed by the presence of the bulbous protrusion 32. It takes a

separating force F1 of between one-half pound and five pounds in direct tension to directly pull the bulbous protrusion 32 from the tapered recess 36 when the two halves 26, 28 of the safety connector 25 are joined. The amount of force F1 in direct tension needed to separate the two halves 26, 28 of the safety connector 25 is determined by the degree of physical interference between the bulbous protrusion 32 and the tapered recess 36. The larger the amount of physical interference, the larger the separating force F1 needed to pull the two halves 26, 28 of the safety connector 25 apart. The amount of separating force F1 needed to directly pull the safety connector 25 apart is engineered to be between fifty percent and ninety percent the breaking tensile strength of the tether 14. As such, if the tether 14 has a breaking tension of one pound, the safety connector 25 preferably requires a separating force F1 of between one half pound and 9/10ths of a pound to open.

The shape of the bulbous protrusion 32 only causes an interference fit with the tapered recess 36 when a direct separating force F1 is applied to opposite ends of the safety connector 25. Since both

ends of the safety connector 25 are attached to segments of a flexible tether 14, the tether 14 is only capable of applying direct tension to the safety connector 25. The safety connector 25 will therefore remain interconnected while the yo-yo ball is in play unless the tether 14 experiences a tension that approaches the tensile strength of the tether 14. In such a situation, the safety connector 25 separates and severs the tether 14 connection before the tether 14 breaks. The controlled separation of the safety connector 25 can be quickly mended by joining the two halves 26, 28 of the safety connector 25 back together. This saves the tether 14 from breaking at an uncontrolled point that cannot be readily repaired.

A unique feature of the safety connector 25 is that when a bending moment is applied to the safety connector 25, the bulbous protrusion 32 turns within the confines of the tapered recess 36. Referring to Fig 4, it can be seen that the first half 26 of the safety connector 25 has a central axis 41. The bulbous protrusion 32 is symmetrically formed around the central axis 41. Similarly, the second half 28 of the safety connector 25 is symmetrically formed

around a central axis 42. When the safety connector 25 is closed, the central axis 41 from the first half 26 is concentric with the central axis 42 of the second half 28. However, when a bending moment is applied to the safety connector 25, the safety connector bends at its mid-point. The central axis 41 of the first half 26 then moves at an angle to the central axis 42 of the second half 28. As the two halves 26, 28 move out of alignment, the bulbous protrusion 32 turns within the confines of the tapered recess 36. The recessed neck region 34 under the bulbous protrusion 33 then receives the front edge of the tapered recess 36. At this point, the bulbous protrusion 33 no longer creates an interference fit with the tapered recess 36 and the bulbous protrusion 32 can pass out of the tapered recess 36 unobstructed.

Accordingly, when a bending moment of only a few ounces is applied to the safety connector 25, the two halves 26, 28 of the safety connector 25 separate. Thus, the force needed to separate the two halves 26, 28 of the safety connector 25 in tension is many times greater than the force needed to separate the

two halves 26, 28 of the safety connector 25 when bending the safety connector 25.

Referring to Fig. 5, it can be seen that a bending moment is applied to the safety connector 25 when the tether 14 wraps around an object 50. As the tether 14 wraps around an object 50, the safety connector 25 is biased against the entangled object 50. The tether 14 applies forces to the ends of the safety connector 25 that are not in line with the mid-axis of the safety connector 25. Simultaneously, the center of the safety connector 25 presses against the entangled object 50. As a result, a bending moment is created in the safety connector 25 that causes the two halves 26, 28 of the safety connector 25 to separate. The magnitude of the bending moment is directly proportional to the length of the safety connector 25. The longer the safety connector 25 is, the larger the bending moment it will experience as the tether 14 wraps around an object. Thus, the sensitivity of the safety connector 25 can be varied for different model toys by varying the length of the safety connector 25. In the preferred embodiment, each half 26, 28 of the safety connector 25 has a length of at least one-half inch. This gives the

overall safety connector 25 a length of at least one inch. Such a length does not interfere with the usage of the yo-yo ball yet provides proper separation should the tether 14 become entangled around the neck, arm or leg of a child.

It will be understood that the embodiment of the present invention device and method that are described and illustrated herein are merely exemplary and a person skilled in the art can make many variations to the embodiments shown without departing from the scope of the present invention. For example, there are many types of tethered toys besides yo-yo balls. The technology of the present invention can be applied to the tether of any tether toy. Furthermore, the configuration of the tapered recess and bulbous protrusion can also be modified into many forms. For example, the tapered recess can be a straight recess with an internal groove. The bulbous protrusion can have a mushroom shape, T-shape, lollipop shape and/or many other functionally equivalent shapes. All such variations, modifications and alternate embodiments are intended to be included within the scope of the present invention as defined by the appended claims.